

# Claims

- [c1] What is claimed is:  
A microfluidic device comprising:  
a first compartment and a second compartment coupled  
by a region having micron sized grooves, where said first  
compartment is capable of being fluidically isolated from  
said second compartment via hydrostatic pressure.
- [c2] The microfluidic device of claim 1 wherein said first  
compartment comprises a somal compartment.
- [c3] The microfluidic device of claim 2 wherein said second  
compartment comprises a neuritic compartment.
- [c4] The microfluidic device of claim 3 wherein neuron pro-  
cesses grow from said first compartment to said second  
compartment.
- [c5] The microfluidic device of claim 4 where insults intro-  
duced to said second compartment stay substantially  
within said second compartment.
- [c6] The microfluidic device of claim 4 where patterned lines  
enable targeted growth of said neuron processes.

- [c7] The microfluidic device of claim 6 wherein said patterned lines comprise polylysine.
- [c8] The microfluidic device of claim 1 wherein said microfluidic device is covalently bonded to glass via air plasma treatment.
- [c9] The microfluidic device of claim 1 wherein said microfluidic device is pressed to a culture dish to create a water-tight seal.